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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,849	07/28/2006	Toshiaki Shimada	293723US40PCT	9845
22850 7590 09/09/2010 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER KNUTSON, JACOB D				
ART UNIT 3611		PAPER NUMBER		
NOTIFICATION DATE 09/09/2010		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/587,849

**Applicant(s)**

SHIMADA ET AL.

**Examiner**

JACOB KNUTSON

**Art Unit**

3611

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 3,6,11,14 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-2,4-5,7-10,12-13,15-18,20-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims **1, 2, 4 - 5, 7 and 20 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Hardgrove et al. (US 5,407,092)** in view of **Kobayashi et al. (JP 09042595)**.

For claim 1, Hardgrove et al. discloses a pressure vessel liner comprising a tubular trunk 6 having end openings at opposite ends of the trunk; a plurality of head plates joined to the trunk at the opposite ends and closing the end openings of the trunk, respectively as shown in Fig. 1 and stated in column 4, lines 23 – 26; and a reinforcing member 9, 11, 20 and 21 fixedly provided in an interior space formed by the trunk and the head plates, the reinforcing member dividing the interior space into a plurality of spaces 22 and 24, and the head plates are joined to the reinforcing member as shown in Fig. 1, at least one of the head plates is in the form of an outwardly bulging dome, and the reinforcing member has an end portion which projects beyond the trunk and is fitted to the form of the outwardly bulging dome of the at least one of the head plates as shown in Fig. 1, but does not explicitly disclose the reinforcing member is fixedly provided on an inner peripheral surface and comprises a plurality of walls .

Kobayashi et al. discloses wherein a reinforcing member 9 is fixedly provided on an inner peripheral surface 3 of the trunk, and comprises a plurality of reinforcing walls 9 extending

from the inner peripheral surface of the trunk toward the center line of the trunk and joined to one another on the center line as shown in Fig. 6 to allow for a more uniform distribution of pressure and reduces manufacturing costs.

Therefore, it would have been obvious to one skilled in the art to alternatively use the reinforcing member of Kobayashi et al. with the pressure vessel of Hardgrove et al. for the reasons set forth above.

For claim 2, Hardgrove et al. modified as above discloses the pressure vessel liner wherein the combined length of joints between each of the head plates and the reinforcing member is at least 60% of the combined length of portions of the reinforcing member in contact with the inner surface of the head plate as shown in Fig. 1.

For claim 4, Hardgrove et al. modified as above discloses the pressure vessel liner wherein the head plates are formed separately from the trunk and are joined respectively to opposite ends of the trunk as stated in column 4, lines 23 – 26.

For claim 5, Hardgrove et al. modified as above discloses the pressure vessel liner wherein one of the head plates is formed integrally with one end of the trunk and the other head plate is formed separately from the trunk and joined to the other end of the trunk as stated in column 4, lines 23 – 26.

For claim 7, Hardgrove et al. modified as above discloses the pressure vessel liner wherein one of the head plates has a flat inner surface as shown in Fig. 1.

For claim 20, Hardgrove et al. modified as above discloses a pressure vessel comprising a pressure vessel liner which is covered with a fiber reinforced resin layer 7 over an outer peripheral surface thereof as stated in column 4, lines 39 – 47.

1. Claims 8 – 9, 12, 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardgrove et al. (US 5,407,092) in view of Kobayashi et al. (JP 09042595), Blair et al. (US 6,095,367) and Klotz et al. (US 6,517,614 B1).

For claim 8, Hardgrove et al. discloses a process for fabricating a pressure vessel liner, comprising a tubular trunk 6 having open ends at opposite ends; forming two head plates at least one of which is in the form of an outwardly bulging dome as stated in column 4, lines 23 – 26 and shown in Fig. 1, the head plates being configured to be joined to the trunk at the opposite ends and close the open ends of the trunk, respectively as shown in Fig. 1; a reinforcing member 9, 11, 20, 21 and 23 configured to divide an interior space formed by the trunk and the head plates into a plurality of spaces 22 and 24, the reinforcing member having an end portion which is configured to project beyond the trunk and is fitted to the form of the outwardly bulging dome as shown in Fig. 1; inserting the reinforcing member into the trunk such that the end portion of the reinforcing member projects beyond the trunk and is fitted to the form of the outwardly bulging dome of the at least one of the head plates as shown in Fig. 1; joining the trunk to the reinforcing member such that an outer edge of the reinforcing member 23 is in contact with an inner surface of the trunk and comprises a plurality of reinforcing walls 23; joining the two head plates respectively to the opposite ends of the trunk as shown in Fig. 1 and stated in column 4, lines 23 – 26; and joining the two head plates to the reinforcing member as shown in Fig. 1, but does not explicitly express the reinforcing member to be extruded, joining the head plates to the reinforcing member by friction agitation or wherein the plurality of reinforcing walls join at the center line of the trunk.

Kobayashi et al. discloses joining the trunk to the reinforcing member such that an outer edge of the reinforcing member is in contact with an inner surface 3 of the trunk and comprises a plurality of reinforcing walls 9 joined to one another on the center line of the trunk as shown in Fig. 6 to allow for a more uniform distribution of pressure and reduces manufacturing costs but does not explicitly express the reinforcing member to be extruded and joining the head plates to the reinforcing member by friction agitation.

Blair et al. discloses tubular trunks 12 (cells) formed by extruding in column 9, lines 23 - 25, where the trunk is being extruding this also forms the head plates, but does not explicitly disclose friction agitation to allow for creating a specific shape to increase compact-ability or create a more aesthetic appeal but does not explicitly express joining the head plates to the reinforcing member by friction agitation. It is well known in the art the ability to extrude tubular structures along with internal structures that will be inserted into the tubular structure to create a specific shape.

Klotz et al. discloses synthetic resin housing parts bonded by friction welding as stated in claim 5 to allow for creating a specific shape to increase the integrity of the overall structure. It is well known in the art the ability to bond structures together to create a specific shape.

Therefore, it would have been obvious to one skilled in the art to alternatively use the reinforcing member of Kobayashi et al. and to use the manufacturing processes of Blair et al. and Klotz et al. with the pressure vessel of Hardgrove et al. for the reasons set forth above.

For claim 9, Hardgrove et al. modified as above discloses the process for fabricating a pressure vessel liner wherein the trunk is joined to the reinforcing member by friction agitation from outside the trunk when using the friction welding of Klotz et al.

For claim 12, Hardgrove et al. discloses a process for fabricating a pressure vessel liner comprising a tubular trunk 6 having open ends at opposite ends and a reinforcing member 9, 11, 20, 21 and 23 dividing an interior space of the trunk into a plurality of spaces 22 and 24 in the form of an integral assembly such that the reinforcing member is joined to an inner peripheral surface of the trunk as shown in Fig. 1, and comprises a plurality of reinforcing walls 23 extending from the inner peripheral surface of the trunk toward the center line of the trunk as shown in Fig. 1, the reinforcing member having an end portion projecting beyond the trunk and configured to be fitted to the form of an outwardly bulging dome and as shown in Fig. 1 of at least one of head plates configured to be joined to the trunk at the opposite ends and close the open ends of the trunk, respectively as shown in Fig. 1; forming two head plates at least one of which is in the form of the outwardly bulging dome as stated in column 4, lines 23 – 26, the head plates being configured to be joined to the trunk at the opposite ends and close the open ends of the trunk as stated in column 4, lines 23 – 26, respectively; joining the two head plates respectively to the opposite ends of the trunk such that the end portion of the reinforcing member is fitted to the form of the outwardly bulging dome of the at least one of the head plates as shown in Fig. 1; and joining the two head plates to the reinforcing member but does not explicitly express the reinforcing member to be extruded, joining the head plates to the reinforcing member by friction agitation or wherein the plurality of reinforcing walls join at the center line of the trunk.

Kobayashi et al. discloses joining the trunk to the reinforcing member such that an outer edge of the reinforcing member is in contact with an inner surface 3 of the trunk and comprises a plurality of reinforcing walls 9 joined to one another on the center line of the trunk as shown in

Fig. 6 to allow for a more uniform distribution of pressure and reduces manufacturing costs but does not explicitly express the reinforcing member to be extruded and joining the head plates to the reinforcing member by friction agitation.

Blair et al. discloses tubular trunks 12 (cells) formed by extruding in column 9, lines 23 - 25, where the trunk is being extruding this also forms the head plates, but does not explicitly disclose friction agitation to allow for creating a specific shape to increase compact-ability or create a more aesthetic appeal but does not explicitly express joining the head plates to the reinforcing member by friction agitation. It is well known in the art the ability to extrude tubular structures along with internal structures that will be inserted into the tubular structure to create a specific shape.

Klotz et al. discloses synthetic resin housing parts bonded by friction welding as stated in claim 5 to allow for creating a specific shape to increase the integrity of the overall structure. It is well known in the art the ability to bond structures together to create a specific shape.

Therefore, it would have been obvious to one skilled in the art to alternatively use the reinforcing member of Kobayashi et al. and to use the manufacturing processes of Blair et al. and Klotz et al. with the pressure vessel of Hardgrove et al. for the reasons set forth above.

For claim 15, Hardgrove et al. discloses a process for fabricating a pressure vessel liner, comprising forming a tubular trunk 6 having open ends at opposite ends and a head plate closing one of the open ends of the trunk by forging in the form of an integral assembly as stated in column 4, lines 23 - 26; forming a head plate configured to close the other open end of the trunk as stated in column 4, lines 23 - 26, at least one of the head plates being in the form of an outwardly bulging dome as shown in Fig. 1, a reinforcing member 9, 11, 20, 21 and 23



configured to divide an interior space 22 and 24 formed by the trunk and the head plates into a plurality of spaces 22 and 24, the reinforcing member having an end portion which is configured to project beyond the trunk and is fitted to the form of the outwardly bulging dome; inserting the reinforcing member into the trunk such that the end portion of the reinforcing member projects outward beyond the trunk and is fitted to the form of the outwardly bulging dome of the at least one of the head plates as shown in Fig. 1; joining the trunk to the reinforcing member such that an outer edge of the reinforcing member 23 is in contact with an inner surface of the trunk and comprises a plurality of reinforcing walls 23 joined to one another as shown in Fig. 1; joining the head plate formed separately from the trunk to the other end of the trunk; and joining the two head plates to the reinforcing member as shown in Fig. 1 but does not explicitly express the reinforcing member to be extruded, joining the head plates to the reinforcing member by friction agitation or wherein the plurality of reinforcing walls join at the center line of the trunk.

Kobayashi et al. discloses joining the trunk to the reinforcing member such that an outer edge of the reinforcing member is in contact with an inner surface 3 of the trunk and comprises a plurality of reinforcing walls 9 joined to one another on the center line of the trunk as shown in Fig. 6 to allow for a more uniform distribution of pressure and reduces manufacturing costs but does not explicitly express the reinforcing member to be extruded and joining the head plates to the reinforcing member by friction agitation.

Blair et al. discloses tubular trunks 12 (cells) formed by extruding in column 9, lines 23 - 25, where the trunk is being extruding this also forms the head plates, but does not explicitly disclose friction agitation to allow for creating a specific shape to increase compact-ability or create a more aesthetic appeal but does not explicitly express joining the head plates to the

reinforcing member by friction agitation. It is well known in the art the ability to extrude tubular structures along with internal structures that will be inserted into the tubular structure to create a specific shape.

Klotz et al. discloses synthetic resin housing parts bonded by friction welding as stated in claim 5 to allow for creating a specific shape to increase the integrity of the overall structure. It is well known in the art the ability to bond structures together to create a specific shape.

Therefore, it would have been obvious to one skilled in the art to alternatively use the reinforcing member of Kobayashi et al. and to use the manufacturing processes of Blair et al. and Klotz et al. with the pressure vessel of Hardgrove et al. for the reasons set forth above.

For claim 18, Hardgrove et al. modified as above discloses a process for fabricating a pressure vessel liner wherein the trunk is joined to the reinforcing member by friction agitation from outside the trunk when using the friction welding of Klotz et al.

For claim 20, Hardgrove et al. modified as above discloses a pressure vessel comprising a pressure vessel liner which is covered with a fiber reinforced resin layer 7 over an outer peripheral surface thereof as stated in column 4, lines 39 – 47.

2. Claims **10, 13, 16 and 17 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Hardgrove et al. (US 5,407,092)** in view of **Kobavashi et al. (JP 09042595)**, **Blair et al. (US 6,095,367)** and **Klotz et al. (US 6,517,614 B1)** and further in view of **Taylor (US 7,093,337 B1)**.

For claim 10, 13, 16 and 17, Hardgrove et al. modified as above discloses wherein one of the head plates is formed and wherein when the integral assembly of the trunk and the head plate is formed and an outwardly extending projection is formed on an outer surface of said one head plate integrally therewith, and which includes providing a mouthpiece portion 3 by forming a

through bore extending from an outer end face of the projection to an inner surface of said one head plate after joining the two head plates respectively to the opposite ends of the trunk and joining the two head plates to the reinforcing member as shown in Fig. 1, but does not disclose the headplate is formed by forging.

Taylor discloses that all of the components of his apparatus may be formed by forging as stated in column 13, lines 45 – 51 to allow for the closing of porosity, weld cracks and no sand inclusions which improve the integrity of the apparatus structure.

Therefore, it would have been obvious to one skilled in the art to use the process of forging of Taylor with the pressure vessel of Hardgrove et al. for the reasons set forth above.

3. Claims **21 – 26 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Hardgrove et al. (US 5,407,092)** in view of **Kobayashi et al. (JP 09042595)** and further in view of **Oglesby et al. (US 6,628,006 B2)**.

For claim 21, Hardgrove et al. modified as above does not explicitly disclose a fuel cell system comprising a fuel hydrogen pressure vessel, a fuel cell and pressure piping.

Oglesby et al. discloses a fuel cell system 10 comprising a fuel hydrogen pressure vessel 16, a fuel cell 12 and pressure piping as stated in column 3, lines 26 – 30 for delivering fuel hydrogen gas from the pressure vessel to the fuel cell therethrough to allow for use of fuel cell power to have two power sources which help create an alternative means for power.

Therefore, it would have been obvious to one skilled in the art to alternatively use the pressure vessel of Hardgrove et al. in a fuel cell system of Oglesby et al. for the reasons set forth above.

For claim 22, Hardgrove et al. modified as above discloses a fuel cell motor vehicle 14 having installed therein a fuel cell system as stated in column 3, lines 1 – 4 of Oglesby et al..

For claim 23, Hardgrove et al. modified as above disclose a cogeneration system (hybrid-electric vehicle) comprising the fuel cell system 10.

For claim 24, Hardgrove et al. modified as above does not explicitly disclose a natural gas supply system comprising a natural gas pressure vessel and pressure piping.

Oglesby et al. discloses a natural gas supply system 10 comprising a natural gas pressure vessel 16 and pressure piping column 3, lines 26 – 30 for delivering natural gas to allow for use of fuel cell power to have two power sources which help create an alternative means for power.

Therefore, it would have been obvious to one skilled in the art to alternatively use the pressure vessel of Hardgrove et al. in a natural gas supply system of Oglesby et al. for the reasons set forth above.

For claim 25, Hardgrove et al. modified as above discloses a cogeneration system comprising a natural gas supply system, a generator 76 and a generator drive device 18.

For claim 26, Hardgrove et al. modified discloses the natural gas motor vehicle 14 comprising a natural gas supply system 10 and an engine (hybrid-electric vehicle as stated in column 3, lines 1 – 4) for use with natural gas as a fuel.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-2, 4-5, 7-10, 12-13, 15-18 and 20-26 have been considered but are moot in view of the new ground(s) of rejection Hardgrove et al. (US 5,407,092) in view of Kobayashi et al. (JP 09042595), Blair et al. (US 6,095,367) and Klotz et al.

(US 6,517,614 B1) and further in view of Taylor (US 7,093,337 B1) and Oglesby et al. (US 6,628,006 B2)

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is 571-270-5576. The examiner can normally be reached on Monday to Thursday, 6:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lesley Morris can be reached on 571-272-6651. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JK/  
August 31, 2010

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